

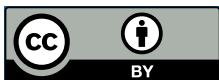
Mud Crab Fishery

2011 fishing year report



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The Mud Crab Fishery (MCF) covers the majority of Queensland tidal waters, except closed waters (Figure 1). This report provides an update to fishing statistics up to 31 Dec 2011.

Mud crabs (*Scylla* spp.) are found throughout the Indo-Pacific region. In Australia, mud crabs are found in tropical and subtropical areas in association with mangrove-lined estuaries from southern New South Wales, north to the Exmouth Gulf in Western Australia. Mud crabs are sought after in the commercial and recreational sectors. Queensland is unique among Australian states in protecting all female mud crabs and only allowing males to be harvested.

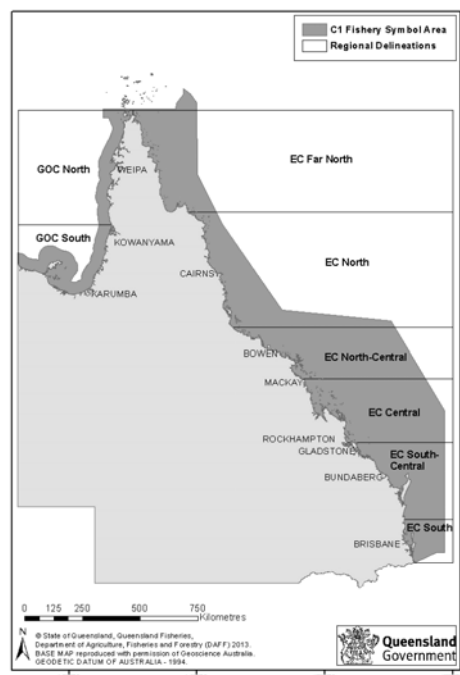


Figure 1: Boundary and regional delineations of the Mud Crab Fishery.

Main features of the fishery

Feature	Details for 2011
Species targeted	Mud crab (<i>Scylla</i> spp.)
Fishery symbols	C1
Current management regime	<i>Fisheries Act 1994</i> , Fisheries Regulation 2008
Gear	Commercial and Recreational <ul style="list-style-type: none"> Traps and crab pots (with rigid or collapsible frames). Crab pots are defined as a fishing apparatus comprising a cage; dimensions of the pots vary but most are cylindrical and have at least two side entrance funnels. Mud crabs are enticed into the pot or trap by bait attached to the inside of the apparatus. Inverted dillies or 'witches hats' have been prohibited for use since April 2010.
Main management methods	Commercial and Recreational <ul style="list-style-type: none"> a minimum legal size limit of 150 mm carapace width, at the widest part a prohibition on taking female crabs closures (Eurimbula Creek and all adjoining waterways are closed to the harvesting of mud crabs, along with closures enforced through marine park zoning established under the Australian Government <i>Great Barrier Reef Marine Park Act 1975</i> and the Queensland <i>Marine Parks Act 2004</i>). Commercial only <ul style="list-style-type: none"> apparatus restrictions (50 pots per licence)

	<ul style="list-style-type: none"> limited entry to the commercial fishery (C1 endorsement required) <p>Recreational only</p> <ul style="list-style-type: none"> apparatus restrictions (4 pots per person) in possession limit of 10 crab per person.
Quota	Not quota managed
Fishing season	1 January to 31 December
Commercial fishery licences	Total number of licences with a C1 symbol: 437 as at December 2011 Number of C1 licences that reported mud crab catch in 2011: 382
Management changes in 2011	Nil
Accreditation under the EPBC Act	Part 13: accredited 10 April 2008 Part 13A: current accreditation expires 24 May 2013
Total annual harvest by sectors	Commercial: 1383 t (2011 logbook returns) Charter: 0.8 t Recreational: 366 t (2010 Statewide Recreational Fishing Survey ¹)
Product price and GVP	Mud crab \$16/kg (live) GVP : Approximately \$22 million in 2011
Stock status	Gulf of Carpentaria: Sustainably fished East Coast: Uncertain For more information refer to the 2012 Stock Status report.
Monitoring done in 2011	Commercial logbooks (CFISH), at-sea observers (catch composition and species of conservation interest (SOCl), biological data (fishery dependant)), Statewide Recreational Fishing Survey (SWRFS)
Compliance and enforcement	Units inspected by Queensland Boating and Fisheries Patrol in 2011: 4845 including the Gulf of Carpentaria (Commercial vessels: 400, majority of remainder were recreational fishers (private or charter). Offences detected in 2011: 457 This equates to compliance rates of 97% for commercial fishers and 94% for recreational fishers corresponding to an overall compliance rate of 94%. These offences do not include incorrectly marked crab pots below. Incorrectly marked crab pots seized from tidal waters in Queensland: 706

¹ The 2010 Statewide Recreational Fishing Survey relates to the 12 month period from October 2010 to September 2011.

Complementary management	Fisheries Queensland continues to collaborate with other states on complementary management arrangements to enable a more complete assessment of mud crab stocks. The Queensland, Northern Territory and Western Australia government officers meet annually at the Northern Australian Fisheries Managers Forum to discuss the management of shared stocks, including those of mud crabs.
Stakeholder engagement	Meetings with stakeholders were held in the first half of 2011 along the east coast of Queensland during the commencement of the review of management arrangements.

Mud crab fishery summary

Catch and effort statistics

Commercial

Total catch, effort (days), licences and GVP in the MCF for 2008–11 are reported in Table 1.

Table 1: Commercial fishery catch, effort and economics in the mud crab fishery 2008–2011 (Source: Fisheries Queensland CFISH Database, 04 April 2012).

	2008	2009	2010	2011
Total catch (t)	1,020	1,052	1,256	1,383
Total effort (days)	38,951	39,645	41,067	41,215
Licences (active)	433	412	385	382
GVP (\$A million)	\$16	\$17	\$20	\$22

There has been an increasing trend in total commercial catch and catch rate (kg/day) over the last five years (Figure 2).

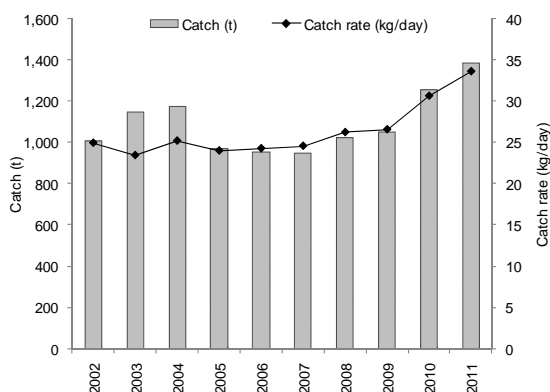


Figure 2: Total commercial catch (in tonnes) and nominal catch per unit effort (kg/day) of mud crabs in the MCF 2002–11 (Source: Fisheries Queensland CFISH Database, 04 April 2012).

East Coast

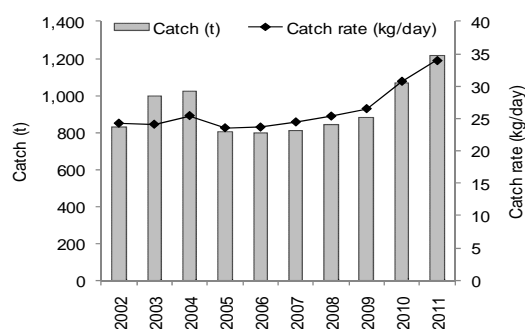


Figure 3: Total commercial catch (t) and catch per unit effort (kg/day) of mud crabs from the east coast of Queensland, 2002–2011 (Source: Fisheries Queensland CFISH database, 04 April 2012).

The east coast has recorded an increasing trend in catch and catch rate. The annual reported commercial mud crab catch for the east coast increased from 878 t in 2009 to 1069 t in 2010 (Figure 3). The number of licences operating in the fishery continues to decline and is the lowest recorded in the last decade with 331 active licences in 2011; however the number of days fished per year by the fleet has increased steadily since 2009. Catch rate on the east coast continues to increase. In 2011, catch rate reached its highest point in the ten year data series peaking at 34 kg/day.

Gulf of Carpentaria

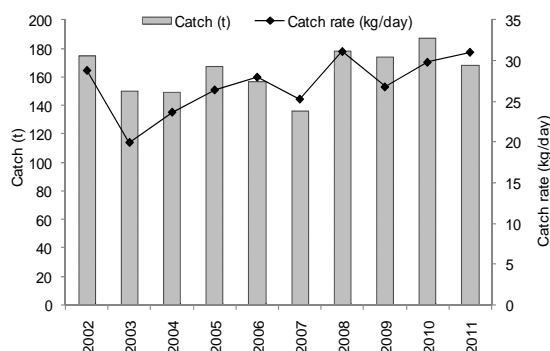


Figure 4: Total commercial catch (t) and catch per unit effort (kg/day) of mud crabs from the Gulf of Carpentaria, 2002–2011 (Source: Fisheries Queensland CFISH database, 04 April 2012).

The Gulf of Carpentaria typically contributes only a small proportion to the total commercial harvest of mud crabs in Queensland. In 2011, the Gulf of Carpentaria contributed approximately 12% to the total commercial harvest. The annual reported commercial mud crab catch for the Gulf of Carpentaria decreased from 187 t in 2010 to 168 t in 2011 (Figure 4). The catch rate has been increasing steadily since 2009 (Figure 4).

Regions

In 2011, East Coast South-Central and East Coast Central recorded the highest catches with 31% (428 t) and 19% (268 t) respectively. Table 2 presents catch from all of the regions.

Region	Weight (t)	% of total catch
EC South-Central	428	31
EC Central	268	19
EC South	189	14
EC North-Central	164	12
GOC South	157	11
EC North	138	10
EC Far North	27	2
GOC North	12	1

Table 2: Regional catch in the commercial mud crab fishery in 2011 (Source: Fisheries Queensland CFISH Database, 04 April 2012).

Charter

The charter component of the Mud Crab Fishery represents the smallest portion of the total 2011 mud crab harvest at approximately 777 kg with 385 kg released. However, charter logbooks are not a mandatory requirement of charter operators operating in estuarine and near shore habitats and therefore logbook data underestimate actual charter catch and effort.

Recreational

The statewide recreational harvest of mud crabs is generally less than the commercial harvest. In 2010, recreational fishers harvested 366 t (11% RSE²) compared to 662 t (11%

²To access the 2010 Statewide Recreational Fishing Survey, refer to http://www.daff.qld.gov.au/28_18273.htm

RSE) in 2000. There is a state-wide trend of falling recreational fishing participation rates and changes in fishing preferences.

Recreational harvest numbers presented in this report include an indication of the mathematical reliability of the estimate (relative standard error (RSE)). This is shown by the number of # marks. No #: RSE-estimate is considered reliable
#: RSE between 25 & 50%-use with caution
##: RSE > 50%-unreliable for general use

Performance against fishery objectives

The Performance Measurement System (PMS) functions as a reporting framework that is a transparent, defensible set of criteria for evaluating the performance of the fishery against management objectives. The full PMS for the Mud Crab Fishery including the links between the objective, indicators and performance measures can be found at

http://www.daff.qld.gov.au/28_11060.htm

In 2011, four performance measures triggered because of higher than expected catch and catch rates (table 3 below). Fisheries Queensland Harvest Management was consulted on the results of the performance measures, and no management response is considered necessary at this time to address the triggered performance measures. Preliminary research by Meynecke (2011, 2012a, 2012b, see 'Research' section below) suggested that a combination of temperature and rainfall/river flow may explain 30 to 70% of the variability in mud crab catches. Increases in catch and catch rates in the Mud Crab fishery may be attributed to the wet weather experienced in coastal areas of Queensland during 2011. Fishers reported another good crabbing season following on from 2010, which was also an excellent season.

Fisheries Observer Program

During 2011, 41 days of observation were recorded in the Mud Crab Fishery. In total, 25 boats had voluntarily participated in this program throughout 2011, with 15 boats taking observers on multiple trips. Observers found that 64% of the catch was male. Of the males, 45% were retained. Of the males released, approximately 80% were undersized and the remaining 20% were soft-shelled. These percentages represent a snapshot of the fishery and may not be representative of the whole fishery due to sampling coverage.

Bycatch

One of the Fisheries Observer Program objectives for the Mud Crab Fishery was to collect information detailing the species composition of bycatch.

No species of conservation interest (SOI) interactions were observed in the Mud Crab Fishery in 2011. The bycatch was predominantly made up of soft male, undersized male and female mud crabs.

Table 3: Performance measures and outcomes for the Mud Crab Fishery in 2011.

Performance measure	Performance
<i>Target species</i>	
<p>1a. Annual commercial standardised pot catch rate falls outside the upper or lower deciles³ for the east coast, Gulf of Carpentaria and specified regional divisions.</p> <p>1b. A consecutive increase or decrease in commercial standardised pot catch rate over the preceding five years for the east coast, Gulf of Carpentaria and specified regional divisions.</p>	<p>1a.</p> <p><i>Triggered (above reference point)</i></p> <ul style="list-style-type: none"> • East Coast Total • Gulf of Carpentaria Total • East Coast Central • East Coast Far North • East Coast North • East Coast North-Central • East Coast South • East Coast South-Central • Gulf of Carpentaria North <p><i>Not Triggered</i></p> <ul style="list-style-type: none"> • Gulf of Carpentaria South <p>1b.</p> <p><i>Triggered (above reference point)</i></p> <ul style="list-style-type: none"> • East Coast Total • East Coast Central • East Coast North • East Coast North-Central • East Coast South • East Coast South-Central <p><i>Not Triggered</i></p> <ul style="list-style-type: none"> • Gulf of Carpentaria Total • East Coast Far North • Gulf of Carpentaria North • Gulf of Carpentaria South

³ The upper and low deciles were calculated from the mean and standard deviation of the previous ten years of data (2000–2009), using a standard statistical formula.

Performance measure	Performance
<p>2a. Annual commercial pot total catch falls outside the upper or lower deciles for the east coast, Gulf of Carpentaria and specified regional divisions.</p> <p>2b. A consecutive increase or decrease in commercial pot total catch over the preceding five years for the east coast, Gulf of Carpentaria and specified regional divisions.</p>	<p>2a.</p> <p><i>Triggered (above reference point)</i></p> <ul style="list-style-type: none"> • East Coast Total • East Coast Central • East Coast North-Central • East Coast South • East Coast South-Central <p><i>Not Triggered</i></p> <ul style="list-style-type: none"> • Gulf of Carpentaria Total • East Coast Far North • East Coast North • Gulf of Carpentaria North • Gulf of Carpentaria South <p>2b.</p> <p><i>Triggered (above reference point)</i></p> <ul style="list-style-type: none"> • East Coast Total • East Coast North-Central • East Coast South-Central <p><i>Not Triggered</i></p> <ul style="list-style-type: none"> • Gulf of Carpentaria Total • East Coast Central • East Coast Far North • East Coast North • East Coast South • Gulf of Carpentaria North • Gulf of Carpentaria South <p><i>Management Response to 1a–2b:</i></p> <p><i>Increases in catch and catch rates in the fishery may be due to recent high rainfall years.</i></p>

Performance measure	Performance
<i>Bycatch and protected species</i>	
The review of the Mud Crab Fishery ERA indicates any bycatch category requires a Level Two Productivity Susceptibility Analysis.	<i>Not measured</i> No ERA was conducted during 2011.
<p>1. Percentage of protected species released alive falls below 90%.</p> <p>2. The review of the Mud Crab Fishery ERA indicates any protected species category requires a Level Two Productivity Susceptibility Analysis.</p>	<p>1a. <i>Not triggered</i> The Mud Crab Fishery did not report interacting with any turtles or crocodiles during 2011.</p> <p>1b. <i>Not measured</i> No ERA was conducted during 2011.</p>
<i>Social</i>	
The rate of compliance falls below 92.5% in the commercial fishery and/or 92.5% in the recreational fishery.	<i>Not triggered</i> 97% - commercial fishers 94% - recreational fishers

Species of conservation interest (SOCI) interactions

No interactions with protected species were reported through the SOCI logbook in 2011 or by observers as part of the Fishery Observer Program.

Compliance statistics

Compliance and enforcement in the Queensland Mud Crab Fishery are the responsibility of the Queensland Boating and Fisheries Patrol (QBFP). A breakdown of the compliance statistics for 2011 is reported in Table 3. It should be noted that 27 prosecution offences recorded below are still pending. Of these offences, 24 were by the commercial sector comprising of 14 operators.

Table 3. Mud Crab Fishery offences in 2011

Offences	Caution	FIN	Prosecution
Commercial fisher take/possess regulated fish	2	1	-
Recreational fisher take/possess regulated fish	79	164	1
Take/possess/sell fish regulated by form	-	-	1
Take/possess/sell fish regulated by gender	-	-	13
Take/possess/sell fish regulated by size	-	-	12
Conduct charter fishing without charter licence/undertake commercial fishing while authority suspended	1	-	-

Contravene a condition of an authority	3	3	2
Contravene a regulated fishing apparatus declaration	91	50	5
Interference with aquaculture activity or fishing apparatus	5	10	-
Fail to give required information to the Chief Executive in stated way or by stated time	-	1	-
Fail to obtain & keep required information for the required period	-	1	-
Provided false or misleading information	-	-	1
Fail to produce a document required to be available for immediate inspection	1	3	1
Did not comply with requirements re boarding of boat etc.	-	-	1
Obstructed an inspector	-	-	5
TOTAL	182	233	42

Research

A number of collaborative research and extension projects have been conducted relating to the Mud Crab Fishery.

As an extension of a fisheries research project developed in the Northern Territory, a small number of Queensland mud crab fishers have been working with fisheries observers in trialing escape vents in their pots. The escape vents are rectangular and are designed to allow undersized crabs that have entered the pot to escape. Preliminary observations have been very positive, with pots that have escape vents fitted to them having fewer undersized crabs and almost no cannibalism of crabs compared to pots without the vents. Queensland mud crab fishers already trialing the use of the escape vent have indicated that they will continue to use and progress towards the installation of this device across all of their C1 apparatus. There has also been interest in the trialing of escape vents from the recreational sector. Fisheries observers have also been promoting the use of these escape vents when doing trips with other commercial mud crab fishers and the uptake of these has been positive.

A collaborative Fisheries Research and Development Corporation (FRDC) funded project between Northern Territory Fisheries, DEEDI, New South Wales Fisheries, Western Australian Fisheries and Griffith University has investigated the effect of climate variability on mud crab stocks. Griffith University researcher Jan-Olaf Meynecke discovered a trend within the catch data. A regional comparison of Australian mud crab catches showed that a combination of temperature and rainfall/river flow may explain 30 to 70% of the variability in mud crab catches. The project was finalised last year and three papers have been finalised relating to this work:

- Meynecke, J.-O, Grubert, M, Arthur, JM, Boston, R, Lee, SY 2012, The influence of the La Niña-El Niño cycle on giant mud crab (*Scylla serrata*) catches in Northern Australia. Estuarine, Coastal and Shelf Science 100, 93-101

- Meynecke, J.-O, Grubert, M, Gillson, J 2012, Giant mud crab (*Scylla serrata*) catches and climate drivers in Australia - a large scale comparison. Marine and Freshwater Research 63, 84-94.
- Meynecke, J-O, Lee, SY 2011, Climate-coastal fisheries relationships and their spatial variation in Queensland, Australia. Fisheries Research 110, 365-376.

There are no direct implications from this research for the management of mud crabs in Queensland; however it is valuable information that provides improved understanding of the factors that influence mud crab biomass.

In 2009, DEEDI Fisheries Research staff held a workshop (2–6 November) to evaluate the risks and benefits of allowing the harvest of female mud crabs in Queensland. A major outcome was that there is no biological or sustainability reason why female mud crabs should not be harvested. However, it was decided that it would be unwise to change the policy until a reliable measure of population abundance could be developed. In 2011 the Queensland Government sought the communities' views on a change to the single sex harvest policy for crabs. There was little support for a change to the policy therefore the decision was made not to amend current management arrangements.

Several projects concerning mud crabs have been jointly funded by FRDC and DAFF Queensland in 2011. Both have achieved successful outcomes. The projects relating to best practice crab handling and improved crab grading scheme are detailed below.

FRDC 2010/302: Equipping the mud crab industry with innovative skills through extension of best practice handling.

DAFF Queensland, Innovative Food Technologies scientists are working in partnership with the Australian mud crab industry to increase the quality of mud crabs. The aim is to protect live crabs as they're

transported, so that they reach the consumer in the best possible condition.

To read the final report, go to

<http://frdc.com.au/research/final-reports/Pages/2010-302-DLD.aspx>

For more information regarding this project, visit:

http://www.daff.qld.gov.au/4791_18089.htm

FRDC 2011/225: Using industry expertise to build a national standard for grading of live mud crabs

Differing interpretations of grading between Australian mud crabbers and distributors have existed in the past. A national scheme has been developed to ensure all harvesters, buyers and marketers have a consistent workable grading scheme for mud crabs, from trap to plate. As a result of work to date, industry has seen an improvement in crab quality and gradings over the past few years. This project is ongoing.

Moreton Bay Marine Park Monitoring Program – mud crabs

In February 2012, Department of Environment and Resource Management published a report, Moreton Bay Marine Park Monitoring Program, which included assessment of the effectiveness of zoning and considered mud crabs in Moreton Bay. A total of 3522 crab pots were set at 671 sites within the inshore areas of Moreton Bay. During this study, 1777 mud crabs were captured, measured and sexed. To view this report, go to:

<http://www.nprsr.qld.gov.au/parks/moreton-bay/zoning/pdf/moreton-marine-park-monitoring-report.pdf>

If there is any research underway relevant to this fishery which has not been included, please contact

fisheriesmonitoring@daff.qld.gov.au

Fishery news

Fisheries Queensland commenced a review of the current crab fishery management arrangements in 2012. The review is progressing and is currently examining management options to address a number of issues that exist in the fishery.

References

Meynecke, J.-O, Grubert, M, Arthur, JM, Boston, R, Lee, SY 2012, The influence of the La Niña-El Niño cycle on giant mud crab (*Scylla serrata*) catches in Northern Australia. Estuarine, Coastal and Shelf Science 100, 93-101

Meynecke, J.-O, Grubert, M, Gillson, J 2012, Giant mud crab (*Scylla serrata*) catches and climate drivers in Australia - a large scale comparison. Marine and Freshwater Research 63, 84-94.

Meynecke, J-O, Lee, SY 2011, Climate-coastal fisheries relationships and their spatial variation in Queensland, Australia. Fisheries Research 110, 365-376.

The State of Queensland, Department of Environment and Resource Management, 2012, Moreton Bay Marine Park Monitoring Program, February 2012.

Information complied by

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Front cover image

Mud Crab (*Scylla serrata*)

